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Taxonomic studies of *Corynespora* from Hainan, China

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Abstract — Four new species of *Corynespora* were found during a continuing survey of anamorphic fungi in tropical areas of Hainan province, China. The new species, *C. beilschmiediae*, *C. cassiae*, *C. fici-benjaminae,* and *C. lasianthi*, occurred on the hosts *Beilschmiedia intermedia*, *Cassia surattensis*, *Ficus benjamina,* and *Lasianthus chinensis*, respectively. They are described, illustrated and compared with closely related taxa.

Key words — dematiaceous, hyphomycetes, taxonomy

Introduction

The genus *Corynespora* was described by Güssow (1906). Wei (1950) emended the diagnosis of the genus and clarified the conidiogenesis of the type species, *C. cassiicola* (Berk. & M.A. Curt.) C.T. Wei. *Corynespora* is characterized by macronematous, mononematous, simple or branched conidiophores with monotretic, determinate or percurrently extending conidiogenous cells, and obclavate to slightly ellipsoid, distoseptate, solitary or catenate conidia. These characters separate *Corynespora* Güssow from similar genera, viz. *Helminthosporium* Link, *Corynesporella* Munjal & H.S. Gill, *Hemicorynespora* M.B. Ellis, *Corynesporopsis* P.M. Kirk and *Solicorynespora* R.F. Castañeda & W.B. Kendr. Conidial characters (size, shape, septation, ornamentation and, to some extent, pigmentation) and the proliferation of conidiophores have been used to distinguish species within the genus (Ellis 1957, 1976; Siboe et al. 1999). Many species in genera such as *Cercospora* Fres. and *Helminthosporium* have been transferred to *Corynespora*. Ellis (1957, 1960, 1961a, b, 1963a, b, 1971, 1976), MorganJones (1988), Sutton & Pascoe (1988), Meenu et al. (1997, 1998), Siboe et al. (1999), Singh et al. (2000a, b), Sharma et al. (2002) and Wulandari

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(2006) have added many species to the genus.

More than 100 species have been validly described under *Corynespora*, most of which are reported to be parasites on plant leaves, but some species survive as saprobes on dead branches, wood, etc. Twenty species have been described from China, four parasitic on plant leaves (Guo 1984), and 16 saprobic on deciduous stems or wood (Zhang et al. 2005, 2007, 2008; Ma & Zhang 2007, 2008; Shang & Zhang 2007, Wang & Zhang 2007).

Fungi were collected on dead branches or rotten wood from tropical forest in Hainan province of China during 2007. Among the collections four undescribed species of *Corynespora* were found. The type specimens are deposited in HSAUP (Herbarium of the Department of Plant Pathology, Shandong Agricultural University) with isotypes in HMAS (Mycological Herbarium, Institute of Microbiology, Chinese Academy of Sciences).

Taxonomic descriptions

Corynespora beilschmiediae K. Zhang & X.G. Zhang**, sp. nov.** FIGURE 1

MycoBank mb 511436

Coloniae fuscae, effusae. Mycelium semper superficiale, ex hyphis ramosis, septatis, subhyalinis vel brunneis, laevibus, 2–8 µm crassis compositum. Stromata nulla. Conidiophora singula vel fasciculata, ex apice lateribusque hypharum oriunda, erecta, nonramosa, recta vel flexuosa, cylindrica, septata, laevia, pallide brunnea vel brunnea, per usque ad 2 proliferationes percurrentes successivas cylindricae elongascentia, 33.5–81.5 µm longa, 3.5–5.5 µm crassa. Conidia recta vel curvata, obclavata, longe attenuata, laevia, pallide brunnea vel brunnea, 7–19-distoseptata, 52–144.5 µm longa, 8.5–11 µm crassa, apicem versus ad 3–5 µm attenuata, basi 2–3 µm lata, singula, primo in apice conidiophori et dein proliferationis cujusque successivae oriunda.

Holotype: CHINA, Hainan Province, Jianfengling National Forest park, on dead branches of *Beilschmiedia intermedia* C.K. Allen, 21 May 2007, K. Zhang, HSAUPVII0-zk 0241 (Isotype HMAS189370).

Etymology: In reference to the host genus, *Beilschmiedia*.

Colonies blackish brown, effused. Mycelium mostly superficial on the substratum, composed of branched, septate, subhyaline to brown, smooth-walled hyphae, 2–8 µm thick. Stroma absent. Conidiophores arising singly or in groups, terminally and laterally on the hyphae, erect, unbranched, straight or flexuous, cylindrical, septate, smooth-walled, pale brown to brown, with up to 2 successive percurrent cylindrical proliferations, 33.5–81.5 µm long, 3.5–5.5 µm thick. Conidia straight or curved, obclavate, tapering to the apex, smooth-walled, pale brown to brown, 7–19-distoseptate, 52–144.5 µm long, 8.5–11 µm thick in the broadest part, tapering to 3–5 µm near the apex, 2–3 µm wide at the base, formed singly through a pore at the apex of the conidiophore which, after the first conidium has fallen, sometimes proliferates through the apical pore and forms another conidium at the apex of the proliferation.

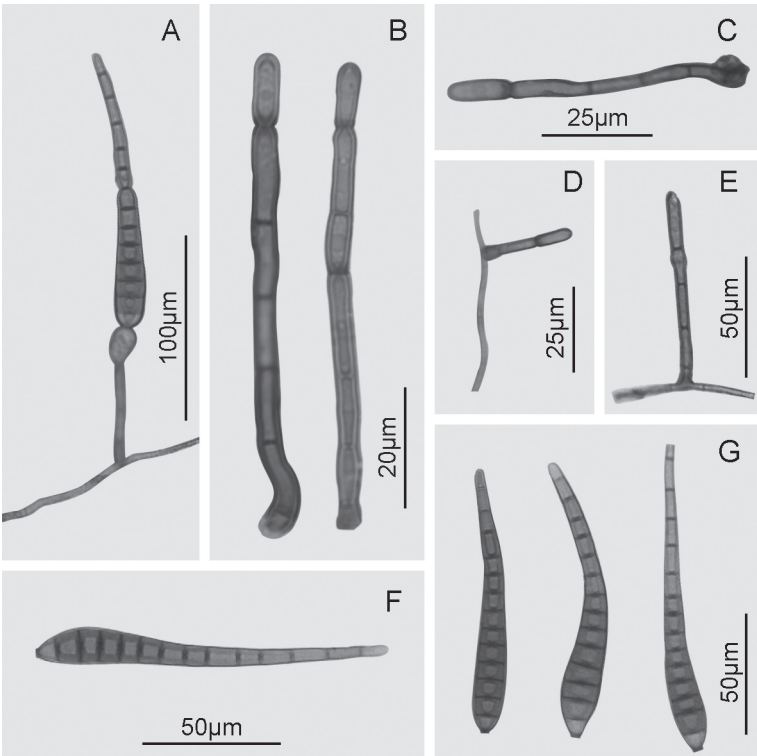

Fig. 1. *Corynespora beilschmiediae*. A. Conidiophore and conidium. B–E. Conidiophores with apex showing percurrent proliferation. F–G. Conidia.

Comments: Among described species only *C. combreti* (Ellis 1963b) is similar to *C. beilschmiediae*. However, *C. beilschmiediae* differs from *C. combreti* in the size of conidiophores, which are unbranched in *C. beilschmiediae*. The width of the conidial apex and number of septa also differ in *C. beilschmiediae.*

Corynespora cassiae K. Zhang & X.G. Zhang**, sp. nov.** figure 2

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Coloniae griseae vel fuscae, effusae. Mycelium superficiale, ex hyphis ramosis, septatis, subhyalinis vel pallide brunneis, laevibus, 2–8 μm crassis compositum. Stromata nulla. Conidiophora singula vel fasciculata, erecta, nonramosa, recta vel flexuosa, cylindrica, laevia, brunnea, septata, per usque ad 5 proliferationes percurrentes successivas cylindricae elongascentia, 133.5–217.5 μm longa, 6–10 μm crassa. Conidia singula, primo in apice conidiophori et dein proliferationis cujusque successivae oriunda, recta vel leviter curvata, pallide brunnea vel olivaceo-brunnea, obclavata, longe attenuata, laevia, 10–21-distoseptata, 107.5–214 μm longa, 11–14 μm crassa, apicem versus ad 3–4.5 μm attenuata, basi truncata 5–6.5 μm lata.

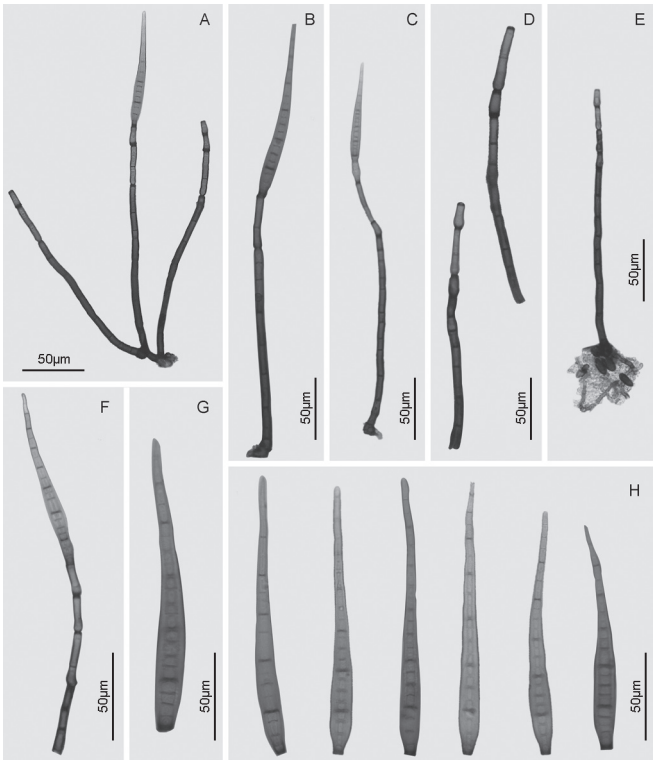

Fig. 2. *Corynespora cassiae*.
A–F. Percurrent proliferations of conidiophores with or without conidia. G–H. Conidia.

Holotype: CHINA, Hainan Province, Danzhou Tropical Arboretum, on dead branches of *Cassia surattensis* Burm. f., 28 April 2007, J. Ma, HSAUPVII$_{0MJ}$ 0039–1 (Isotype HMAS189371).

Etymology: In reference to the host genus, *Cassia*.

Colonies grey to blackish brown, effused. Mycelium on substratum, mostly superficia, composed of branched, septate, subhyaline to pale brown, smooth-walled hyphae, 2–8 μm thick. Stroma absent. Conidiophores arising singly or in groups, erect, unbranched, straight or flexuous, cylindrical, smooth-walled, brown, septate, with up to 5 successive percurrent cylindrical proliferations, 133.5–217.5 μm long, 6–10 μm thick. Conidia formed singly through a pore at the apex of the conidiophore, which then proliferates through the apical pore and forms another conidium at the apex of the proliferation. Conidia straight or slightly curved, pale brown to olivaceous brown, becoming gradually paler towards the apex, obclavate, tapering to the apex, smooth-walled, 10–21-

distoseptate, 107.5–214 μm long, 11–14 μm thick in the broadest part, tapering to 3–4.5 μm near the apex, 5–6.5 μm wide at the truncate basal scar.

Comments: *C. calicioidea* (Ellis 1957) and *C. polyphragmia* (Ellis 1961b) resemble the present species. The conidiophores of *C. cassiae* are shorter than those of *C. calicioidea* and *C. polyphragmia*. The conidiophores of *C. cassiae* proliferate up to 5 times while those of *C. calicioidea* and *C. polyphragmia* proliferate 8 and 6 times, respectively. The conidia of *C. cassiae* are slightly longer than those of *C. calicioidea* (50–170 μm) and narrower than in *C. polyphragmia* (14–17 μm). *Corynespora cassiae* conidia have an unthickened hilum as against obviously thickened hila in both *C. calicioidea* and *C. polyphragmia*. The conidial base of *C. calicioidea* is narrower than that of *C. cassiae* and *C. polyphragmia*.

Corynespora fici-benjaminae H.B. Fu & X.G. Zhang, **sp. nov.** figure 3

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Coloniae fuscae vel atrae, pilosae, effusae. Mycelium partim superficiale sed fere immersum, ex hyphis ramosis, septatis, subhyalinis vel pallide brunneis, laevibus, 2–5 μm crassis compositum. Stromata nulla. Conidiophora singular, interdum caespitosa, erecta, nonramosa, recta vel flexuosa, cylindrica, septata, laevia, brunnea vel atro-brunnea, per usque ad 3 proliferationes successivas cylindricae elongascentia, 152–467 μm longa, 5.5–11 μm crassa. Conidia recta vel leviter curvata, obclavata, laevia, pallide olivaceo-brunnea, 5–10-distoseptata, 51.5–71 μm longa, 8–11 μm crassa, apicem versus ad 2–3.5 μm attenuata, basi 3–4.5 μm lata. Conidia singula, primo in apice conidiophori et dein proliferationis cujusque successivae oriunda,

Holotype: CHINA, Hainan Province, tropical forest of Wuzhishan, on dead branches of *Ficus benjamina* L., H.B. Fu, 5 May 2007, HSAUPVII0-FU0454 (Isotype HMAS189372).

Etymology: In reference to the host genus, *Ficus*.

Colonies blackish brown to black, hairy, effused. Mycelium partly superficial, but mostly immersed in the substratum, composed of branched, septate, subhyaline to pale brown, smooth-walled hyphae, 2–5 μm thick. Stroma absent. Conidiophores arising singly, sometimes caespitose, erect, unbranched, straight or flexuous, cylindrical, septate, smooth-walled, brown to dark brown, with up to 3 successive cylindrical proliferations, 152–467 μm long, 5.5–11 μm thick. Conidia straight or slightly curved, obclavate, smooth-walled, pale olivaceous brown, 5–10-distoseptate, 51.5–71 μm long, 8–11 μm thick in the broadest part, tapering to 2–3.5 μm near the apex, 3–4.5 μm wide at the base. Conidia formed singly through a pore at the apex of the conidiophore which, after the first conidium has fallen, sometimes proliferates through the apical pore and forms another conidium at the new apex.

Comments: *C. fici-benjaminae* resembles *C. calicioidea*, *C. gigaspora* (Ellis 1957) and *C. fici-altissimage* (Zhang & Xu 2005) in conidiophore structure and conidial shape of conidia, except that the *C. fici-benjaminae* conidiophores are smaller than in *C. calicioidea* and *C. gigaspora* and larger than in *C. fici-*

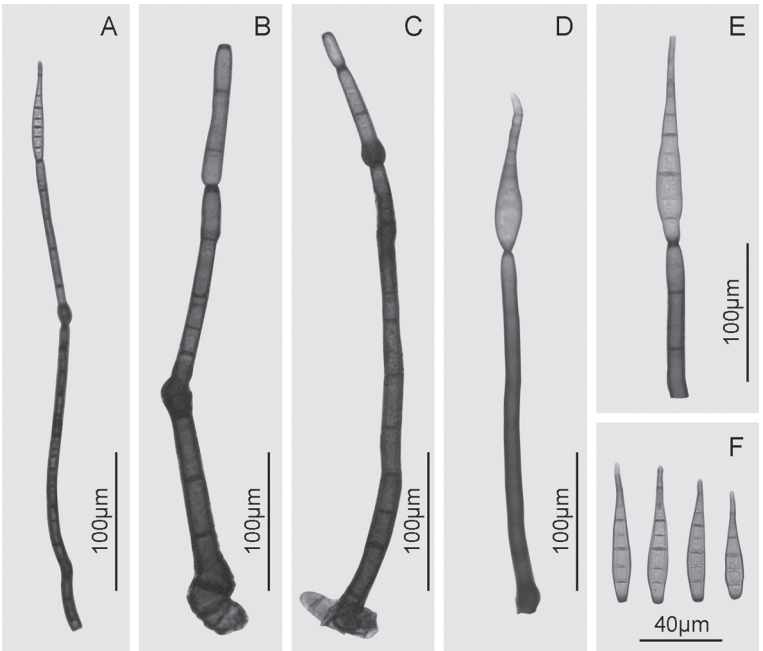

Fig. 3. *Corynespora fici-benjaminae*.
A–E. Conidiophores with or without conidia. F. Conidia.

altissimage. The *C. calicioidea* conidiophores proliferate up to 8 times while those of *C. fici-benjaminae*, *C. gigaspora,* and *C. fici-altissimage* proliferate only 3 times. In addition, the conidial size and number of septa differ from *C. calicioidea* (50–170 × 10–15 μm, 6–21-distoseptate) and *C. gigaspora* (100–270 × 19–28 μm, 9–52-distoseptate). In addition, the *C. fici-benjaminae* conidia have fewer septa (5–10) than those of *C. fici-altissimage* (11–18). Therefore, the present fungus is treated as a new taxon of species rank.

Corynespora lasianthi H.B. Fu & X.G. Zhang, **sp. nov.** FIGURE 4

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Coloniae coloniae fuscae, effusae. Mycelium partim superficiale et partim immersum, ex hyphis ramosis, septatis, subhyalinis vel pallide brunneis, laevibus, 2–6 μm crassis compositum. Stromata nulla. Conidiophora interdum singula sed fere fasciculata, erecta, nonramosa, recta vel flexuosa, cylindrica, septata, laevia, brunnea vel atro-brunnea, per usque ad 3 proliferationes percurrentes successivas cylindricae elongascentia, 119–159 μm longa, 4.5–7.5 μm crassa. Conidia singula, primo in apice conidiophori et dein proliferationis cujusque successivae oriunda, recta vel leviter curvata, obclavata, laevia, interdum rostrata, pallide brunnea vel atro-brunnea, 4–8-distoseptata, 50–103.5 μm longa, 8.5–10 μm crassa, apicem versus ad 3–4 μm attenuata, basi truncata 3–4.5 μm lata.

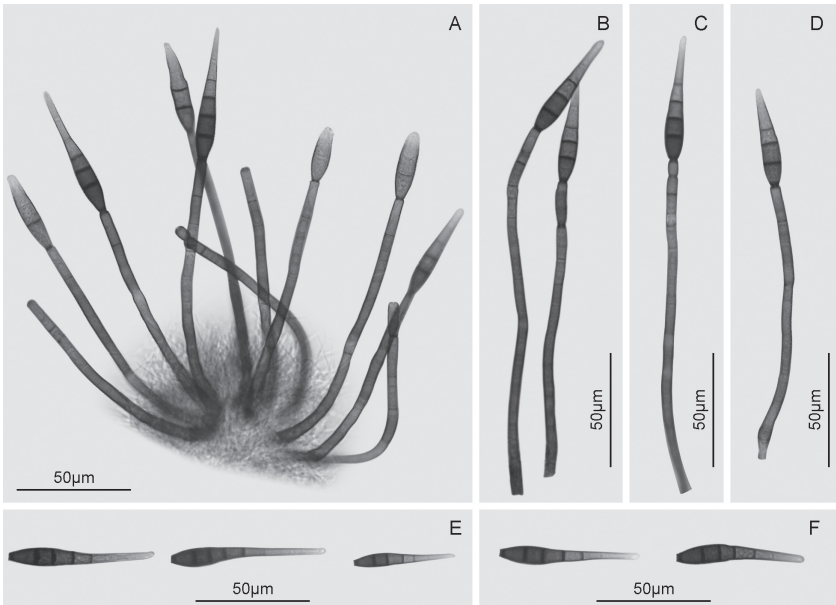

Fig. 4. *Corynespora lasianthi*.
A–D. Conidiophores and conidia. E–F. Conidia.

Holotype: CHINA, Hainan Province, tropical forest of Wuzhishan, on dead branches of *Lasianthus chinensis* Benth., H.B. Fu, 10 May 2007, HSAUPVII$_{0\text{-}FU}$0157 (Isotype HMAS196882).

Etymology: In reference to the host genus, *Lasianthus.*

Colonies blackish brown, effused. Mycelium superficial and immersed in the substratum, composed of branched, septate, subhyaline to pale brown, smooth-walled hyphae, 2–6 μm thick. Stroma absent. Conidiophores in fascicles, sometimes single, erect, unbranched, straight or flexuous, cylindrical, septate, smooth-walled, brown to dark brown, with up to 3 successive percurrent cylindrical proliferations, 119–159 μm long, 4.5–7.5 μm thick. Conidia formed singly through a pore at the apex of the conidiophore which, after the first conidium has fallen, sometimes proliferates through the apical pore and forms another conidium at the apex of the conidiophore. Conidia straight or slightly curved, obclavate, smooth-walled, sometimes rostrate, pale brown to dark brown, becoming gradually paler toward the apex, 4–8-distoseptate, 50–103.5 μm long, 8.5–10 μm thick in the broadest part, tapering to 3–4 μm near the apex, 3–4.5 μm wide at the truncate basal scar.

Comments: *C. lasianthi* shows some affinities with *C. flagellata* (Zhang & Ji 2005) and *C. tanaceti* (Zhang & Zhang 2007) in number of conidiophore

proliferations, dimension of conidiophores, and length of conidia. However, *C. lasianthi* conidia are smooth, while those of *C. flagellata* are verrucose and those of *C. tanaceti* are smooth or verrucose. The *C. lasianthi* conidia are narrower than *C. flagellata* and *C. tanaceti* conidia and have fewer septa (4–8) than those of *C. flagellata* (5–10) and *C. tanaceti* (7–12). Therefore, the present collection is sufficiently distinct to be recognized as a new taxon of species rank.

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Literature cited

Ellis MB. 1957. Some species of *Corynespora*. Mycological Papers 65: 1–15.

Ellis MB. 1960. Dematiaceous hyphomycetes. I. Mycological Papers 76: 19–34.

Ellis MB. 1961a. Dematiaceous hyphomycetes. II. Mycological Papers 79: 1–23.

Ellis MB. 1961b. Dematiaceous hyphomycetes. III. Mycological Papers 82: 1–55.

Ellis MB. 1963a. Dematiaceous hyphomycetes. IV. Mycological Papers 87: 1–42.

Ellis MB. 1963b. Dematiaceous hyphomycetes. V. Mycological Papers 93: 1–33.

Ellis MB. 1971. Dematiaceous Hyphomycetes. Commonwealth Mycological Institute, Kew, Surrey, England. 608pp.

Ellis MB. 1976. More Dematiaceous Hyphomycetes. Commonwealth Mycological Institute, Kew, Surrey, England. 507pp.

Guo YL. 1984. Four new species of the genus *Corynespora*. Acta Mycologica Sinica 3: 161–169.

Güssow HT. 1906. Über eine neue Krankheit der Gurken in England (*Corynespora mazei*, Güssow gen. et sp. nov.). Zeitschrift für Pflkrankheiten 16: 10–13.

Ma J, Zhang K, Zhang XG. 2008. Taxonomic studies of *Corynespora* from Hainan, China. Mycotaxon 104: 153–157.

Ma J, Zhang XG. 2007. Three new species of *Corynespora* from China. Mycotaxon 99: 353–358.

Meenu, Kamal. 1998. New species of *Corynespora*. Mycological Research 102: 344–346.

Meenu, Kharwar RN, Bhartiya HD. 1998. Some new forms of genus *Corynespora* from Kathmandu Valley of Nepal. Indian Phytopathology 51: 146–151.

Meenu, Singh A, Singh SK. 1997. Some new species of *Corynespora*. Indian Phytopathology 50: 17–24.

Morgan-Jones G. 1988. Notes on hyphomycetes LX. Mycotaxon 33: 483–489.

Shang ZQ, Zhang XG. 2007. Two new species of *Corynespora* from Jiangsu, China. Mycotaxon 100: 155–158.

Siboe GM, Kirk PM, Cannon PF. 1999. New dematiaceous hyphomycetes from Kenyan rare plants. Mycotaxon 73: 283–302.

Sutton BC, Pascoe IG. 1988. Some dematiaceous hyphomycetes from branches and phyllodes of *Acacia* in Australia. Australian Systematic Botany 1: 127–138.

Wang XM, Zhang XG. 2007. A new species of *Corynespora* from Yunnan, China. Mycotaxon 101: 79–81.

Wei CT. 1950. Notes on *Corynespora*. Mycological Papers 34: 1–10.

Zhang GM, Zhang XG. 2007. Two new species of *Corynespora* from Guangdong, China. Mycotaxon 99: 347–351.

Zhang K, Ma J, Zhang XG. 2008. Two new species of *Corynespora* from Hainan, China. Mycotaxon 104: 159–163.

Zhang XG, Ji M. 2005. Taxonomic studies of *Corynespora* from Yunnan, China. Mycotaxon 92: 425–429.

Zhang XG, Shi CK. 2005. Taxonomic studies of *Corynespora* from China. Mycotaxon 92: 417–423.

Zhang XG, Xu JJ. 2005. Taxonomic studies of *Corynespora* from Guangxi, China. Mycotaxon 92: 431–436.